

12-28-01

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**UTILITY PATENT APPLICATION TRANSMITTAL**  
(for Noncontinuing, Nonprovisional Applications  
under 37 C.F.R. § 1.53(b))

Attorney Docket No. CML00120H(72470)

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Commissioner of Patents and Trademarks )  
ATTENTION: Assistant Commissioner for Patents )  
Washington, D.C. 20231 )

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Title: METHOD AND APPARATUS FOR )  
FACILITATING WIRELESS )  
COMMUNICATIONS WITH A )  
NONAUTOMOTIVE ROAMING OBJECT )

JOHNNY HAYNES  
(Typed or printed name of person mailing)

Johnny Haynes  
(Signature of person mailing)

First Named Inventor or Application Identifier: )  
Bromham et al. )

- ☒ 23 pages of the specification (including claims) are enclosed.
- ☒ 3 sheet(s) of drawings are enclosed. ☒ Formal ☐ Informal
- ☐ An executed Oath or Declaration and Power of Attorney naming the actual inventors is enclosed.
- ☒ The names of persons believed to be the actual inventors are set forth in the enclosed unexecuted Oath or Declaration and Power of Attorney (§ 1.41(a) and § 1.53(b)).
- ☐ An Assignment of the invention to \_\_\_\_\_, and cover sheet are enclosed.
- ☐ A check in the amount of \$ \_\_\_\_\_ to cover the fee for recording the assignment is enclosed.
- ☐ The Recordation Form Cover Sheet includes authorization to charge our Deposit Account for recording the assignment.
- ☐ A 37 C.F.R. § 3.73(b) statement is enclosed where an assignee seeks to take action.
- ☐ An Information Disclosure Statement is enclosed.
- ☐ A Form PTO-1449 is enclosed.
- ☐ \_\_\_\_\_ References (copies) listed on the Form PTO-1449 are enclosed.
- ☒ A Return Receipt Postcard is enclosed (MPEP § 503).

- ☐ Priority of application number \_\_\_\_\_ filed on \_\_\_\_\_ in \_\_\_\_\_ is claimed under 35 U.S.C. §119.
- ☐ A certified copy of the priority document is enclosed.
- ☐ A Computer Program Listing Appendix is enclosed.
- ☐ A Transmittal Cover Letter for Computer Program Listing Appendix is enclosed.
- ☐ Two (2) Compact Discs are enclosed.
- ☐ A Nucleotide and/or Amino Acid Sequence Submission is enclosed.
- ☐ A Computer Readable Copy is enclosed.
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- ☐ A Statement Verifying Identity of above Copies is enclosed.
- ☒ The filing fee is calculated below:

Fee Calculation For Claims As Filed

Basic Fee						\$	740.00
Independent Claims	4	-	3	=	1	x \$	84.00 = \$ 84.00
Total Claims	40	-	20	=	20	x \$	18.00 = \$ 360.00
Fee for Multiply Dependent Claims						\$	280.00
Total Filing Fee						\$	1,184.00

- ☐ Applicant(s) assert entitlement to Small Entity Status, reducing the Filing Fee by half to: \_\_\_\_\_ \$
- ☐ A check in the amount of \$\_\_\_\_\_ to cover the filing fee is enclosed.
- ☐ Charge \$\_\_\_\_\_ to Deposit Account No. 06-1135.
- ☒ The payment of the Filing Fee is to be deferred until the Declaration is filed. Do not charge our Deposit Account.
- ☒ A separate written request under 37 C.F.R. §1.136(a)(3), which is a general authorization to treat any concurrent or future reply requiring a petition for an extension of time under 37 C.F.R. §1.136(a) for its timely submission as incorporating a petition for an extension of time for the appropriate length of time, is enclosed.

☒ The Commissioner is hereby authorized to charge any additional fees which may be required in this application under 37 C.F.R. §§1.16-1.17 during its entire pendency, or credit any overpayment, to Deposit Account No. 06-1135. Should no proper payment be enclosed herewith, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 06-1135. This sheet is filed in triplicate.


☐ Also enclosed:

☒ Address all future communications to Customer Number 22242.



December 20, 2001

Date

  
Steven G. Parmelee  
Registration No. 28,790

FITCH, EVEN, TABIN & FLANNERY  
Suite 1600  
120 South LaSalle Street  
Chicago, Illinois 60603-3406  
Telephone: (312) 577-7000  
Facsimile: (312) 577-7007

10027223-122001

PATENT

Attorney Docket No. CML00120H(72470)

Commissioner of Patents and Trademarks  
ATTENTION: Assistant Commissioner for Patents  
Washington, D.C. 20231

Applicant(s): Bromham et al.

Appin No.:

Filed: Herewith

For: METHOD AND APPARATUS FOR  
FACILITATING WIRELESS  
COMMUNICATIONS WITH A  
NONAUTOMOTIVE ROAMING  
OBJECT

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CERTIFICATE OF MAILING BY "EXPRESS MAIL"

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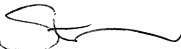
**GENERAL AUTHORIZATION FOR PETITION FOR  
EXTENSION OF TIME UNDER 37 C.F.R. §1.136(a)(3)**

Applicant(s) hereby request under 37 C.F.R. §1.136(a)(3) by this general authorization that any concurrent or future reply submitted by Applicant(s) to the U.S. Patent and Trademark Office for the above-identified patent application requiring a petition for an extension of time under §1.136(a) for its timely submission be treated as incorporating therein a petition for an extension of time for the appropriate length of time.

If Applicant(s) do not timely pay for any extension fee(s) pursuant to 37 C.F.R. §1.136(a) which may become due for this application under 37 C.F.R. §1.17 by check, the Commissioner is hereby authorized to charge such fee(s), and any additional fees which may be required in this application under 37 C.F.R. §§1.16-1.17 during its entire pendency, or credit any overpayment, to Deposit Account No. 06-1135.

December 20, 2001

Date



Steven G. Parmelee

Registration No. 28,790

FITCH, EVEN, TABIN & FLANNERY  
Suite 1600  
120 South LaSalle Street  
Chicago, Illinois 60603-3406  
Telephone: (312) 577-7000  
Facsimile: (312) 577-7007

## Method and Apparatus for Facilitating Wireless Communications with a Nonautomotive Roaming Object

### Technical Field

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This invention relates generally to wireless communications and more particularly to wireless communications that are compatible with a dedicated short range radio frequency-based roadside information service.

### 10 Background

Wireless communications are known. Wireless systems making use of frequency reuse, such as cellular systems, are virtually ubiquitous and dispatch services are also well integrated and dispersed. Both are key  
15 components of modern infrastructure.

Now, at least one group seeks to define a new wireless communications service to specifically facilitate terrestrial-based vehicular journeys (particularly for automobiles and trucks). Presently known as dedicated short  
20 range communications (DSRC), the Federal Communications Commission in the United States has presently at least tentatively identified spectrum that can be used for such journey-related information. The American Society for Testing and Materials presently acts as a standards development group to define such a communications service to support provision of journey-related  
25 information to vehicular users. At present, the over-the-air interface has not been defined (though at least two wireless local area network systems - the I.E.E.#802.11A and Motorola's control channel based Freespace system - have been proposed and are being considered). This group has, however, made considerable progress towards defining the services that the service will  
30 support. In particular, such a journey-related information provision system should ultimately provide roadside information and corresponding vehicle-to-

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vehicle communications to support both public safety and private requirements (depending upon the application transmission range will likely vary from fifteen meters to three hundred meters).

5           As an example of public safety services, such a roadside information system can be expected to support:

- Traffic count (for example, determining the number of vehicles that traverse an intersection over a given period of time);
- Traffic movement information;
- 10   - Toll collection;
- In-vehicle signage (for example, presenting "stop" information within the cockpit of a vehicle as the vehicle approaches a stop sign);
- Road condition warnings;
- Intersection collision avoidance (including highway/rail intersections);
- 15   - Vehicle-to-vehicle information (for example, stopped vehicle or slowing vehicle information);
- Rollover warnings;
- Low bridge warnings;
- Border clearance facilitation;
- 20   - On-board safety data transfer;
- Driver's daily log;
- Vehicle safety inspection information; and
- Emergency vehicle traffic signal preemption.

Examples of private requirements include;

- 25   - Premises access control;
- Gasoline payment;
- Drive-through retail payment;
- Parking lot payments;
- Various vehicular related data transfers (for example, diagnostic data,
- 30   repair service record data, vehicular computer program updates, map information, and user content such as music);

- Rental car processing;
- Fleet management;
- Locomotive fuel monitoring; and
- Locomotive data transfer.

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These capabilities and services hold promise for safer, more convenient, and even more pleasurable terrestrial based journeys. Notwithstanding such promise, however, certain needs and opportunities remain unmet and unaddressed by either such systems as proposed above or as are otherwise

- 10 available in the prior art. For example, no consideration has been given to utilizing such infrastructure to aid in assisting vehicles to avoid collisions with nonautomotive roaming objects such as pedestrians, bicyclists, domestic animals and the like. While active sensors such as automotive radar and night vision systems have been proposed to assist in this regard, no suggestion has
- 15 been made that a dedicated short range radio frequency-based roadside information service infrastructure could be leveraged towards such ends. Similarly, no consideration has been given to other benefits that might accrue to a pedestrian or other nonautomotive roaming object through favorable interaction with such a service.

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A need therefore exists for a way to benefit both the safety and convenience of pedestrians and other nonautomotive roaming objects through some appropriate interaction with a dedicated short range radio frequency-based roadside information service. Solutions should preferably not require a

25 significant expansion of the standard infrastructure for such a system.

### **Brief Description of the Drawings**

- These needs and others are substantially met through provision of the method
- 30 and apparatus for facilitating wireless communications with a nonautomotive roaming object described below. Various benefits will become more clear

upon making a thorough review and study of the following detailed description, particularly when considered in conjunction with the drawings, wherein:

- 5    FIG. 1 comprises a block diagram depiction of a radio configured in accordance with various embodiments of the invention;

FIG. 2 comprises a detailed perspective view of the radio as worn in an exemplary fashion on a belt;

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FIG. 3 comprises a block diagram depiction of a radio as coupled to a portable device in accordance with various embodiments of the invention;

- 15    FIG. 4 comprises a top plan diagrammatic depiction of a radio configured in accordance with various embodiments of the invention and operating within a wireless communications system;

FIG. 5 comprises a flow diagram configured in accordance with various embodiments of the invention;

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FIG. 6 comprises a flow diagram configured in accordance with various embodiments of the invention;

- 25    FIG. 7 comprises a flow diagram configured in accordance with various embodiments of the invention;

FIG. 8 comprises a flow diagram configured in accordance with various embodiments of the invention; and

- 30    FIG. 9 comprises a diagrammatic depiction of a group of radios configured in accordance with various embodiments of the invention.



## Detailed Description

Pursuant to the embodiments described below, a radio that is compatible with a dedicated short range radio frequency-based roadside information service is adapted and configured to be disposed on nonautomotive roaming objects (such objects can be pedestrians of all types, persons in wheelchairs, bicyclists, persons on skateboards, rollerblades, and scooters, as well as domestic animals and certain wild animals, and various non-living but at least occasionally moving objects including toys and the like). Depending upon the intended application, this radio can be a transmit only platform, a receive only platform, or a transceiver platform. In each case, the radio functions compatibly with the dedicated short range radio frequency-based roadside information service which service ordinarily functions to facilitate provision of various kinds of roadside information to vehicles and also certain vehicle-to-vehicle communications. With these basic platforms, various features and functionality can promote increased safety (in particular though not exclusively through object-to-vehicle communications) and increased convenience (in particular though not exclusively through roadside information service-to-object communications).

Referring now to FIG. 1, the radio 10 includes a one-way or two-way radio 11. When only transmission or reception capabilities are required, a transmit-only or receive-only radio 11 will suffice. When both transmission and reception capabilities are required, then a two-way transceiver should be utilized. As noted above, this radio 11 is compatible with a dedicated short range radio frequency-based roadside information service. If desired, the radio 11 can also be made compatible with more than one such roadside information service, and/or other communications services. This radio 11 should at least constitute a short range platform in keeping with the roadside information service operating parameters. In addition, if desired, the radio 11 can also

include an optional high power transmission capability (the benefits of which will be described below in more detail).

- The radio couples to and is at least partially controlled by a processor 12. This processor 12 can be a microprocessor or any other computational platform as will suffice to support the various capabilities described below. The processor 12 couples to a memory 13 that can store both operational software and other information regarding the nonautomotive roaming object with which the radio 10 will be used as described in more detail below. The processor 12 also couples to a user interface 14 and optionally to a location unit 15. The user interface 14 can comprise an input mechanism (such as a text entry device such as a keyboard or touchpad and/or a cursor movement device and/or one or more buttons, switches, or the like) and/or an output mechanism (such as a visual display, an audio transducer, and/or a tactile sensory transducer). The location unit 15, when provided, comprises a unit that can determine either an absolute position of the radio 10 (and hence a nonautomotive roaming object to which the radio 10 is attached) or a relative position of the radio 10 with respect to one or more other objects (such as other similar devices and/or nearby vehicles). The location unit 15 could be, for example, a global positioning system receiver (as exemplified by the optional antenna 16) or other location determining mechanism (such as a dead reckoning based system). (Location information can also be potentially gleaned in other ways that do not require such a location unit 15. For example, roadside transmitters that comprise a part of the dedicated short range radio frequency-based roadside information system may transmit information regarding their own position along with their information payload, and receipt of such information by the radio 10 can be utilized to derive at least an approximate sense of location.)
- Such a radio 10 can and should ordinarily be formed within a relatively small form factor. For some applications (such as a transmit only device intended

- for hidden and/or discrete use) a very small form factor may be appropriate. For other applications, including a two-way device intended to interact in one or more significant ways with an individual wearing the device, a larger form factor may be appropriate and/or necessary. In one embodiment and as
- 5 shown in FIG. 2, the radio 10 can clip to the belt 21 of a pedestrian (not shown) using a variety of known or hereafter developed belt clip techniques. In other embodiments, the radio could be carried by hand, worn on a necklace, placed in a pocket, or secured in a wide variety of other ways. For use with animals, the radio 10 could be placed on a collar (working dogs that
- 10 accompany vision impaired individuals could alternatively have such a radio 10 attached to their harness or lead). With bicycles, skateboards, and the like, the radio 10 could either be attached to the riding individual or to the nonautomotive conveyance itself.
- 15 Many individuals already carry with them a portable electronic device such as a cellular telephone or other portable two-way communications device, a personal digital assistant, a portable computer, a global positioning system receiver and so forth. For at least some individuals, it may be desired to provide the radio 10 as a module that is constructed and arranged to
- 20 physically and operably couple with the portable electronic device of choice. As depicted in FIG. 3, the radio 10 can mount on the exterior of the portable device 31 if desired. This arrangement may be particularly effective when the portable device 31 is itself relatively small, at least in comparison to the radio 10. In another embodiment, the radio 10 can be disposed within a recessed
- 25 area of the portable device (for example, the radio 10 can be configured within the form factor of a PCM-CIA card that can be readily disposed within an accommodating port in, for example, a portable computer or some personal digital assistants. In these various embodiments, various levels of interoperability can be provided as appropriate to the application. In most
- 30 such embodiments, the radio 10 will at least likely couple with the portable device 31 to the extent of drawing at least some operating power for the radio.

In another related embodiment, the radio 10 can comprise a module that physically and operably couples with a vehicle mounted housing. In this embodiment, when mounted within the vehicle housing the radio 10 can function as an ordinary receiving and transmission unit to facilitate communications with the roadside information service as regards operation of the vehicle. Upon removing the radio 10 from the vehicle housing, however, the radio 10 can begin operating in a mode consistent with the teachings set forth herein.

Various operating embodiments of the radio 10 will now be described.

With reference to FIG. 5, when operating in a beacon mode 50 the radio 10 can set 51 a timer or count to a predetermined value (denoted as "X" in FIG. 5) and then transmit 52 information regarding the nonautomotive roaming object with which the radio 10 is being used. The timer or count can then be incremented 53 and a determination 54 made as to whether the timer/count exceeds a predetermined value (denoted as "Y" in FIG. 5). When the count has not been exceeded the timer/count can again be incremented 53 until the count has been exceeded. When the count has been exceeded the process again provides for transmission 52 of object information. In this mode, the radio 10 automatically broadcasts object information from time to time for the benefit of other relatively nearby receiving units.

The information so transmitted can include a number of items. For example, the information can identify the corresponding nonautomotive roaming object itself. This identification can be specific (for example, a driver's license number for an individual carrying the radio 10 could be utilized or a serial number on a bicycle) or somewhat more general. For example, the information could identify or characterize the nonautomotive roaming object as belonging to a particular predefined category (categories can be utilized to

- distinguish between living and non-living objects, pedestrians and bicyclists, able-bodied person and persons with permanent or temporary disabilities, adults and children, joggers and hitchhikers, and so forth). The information could also include present location information regarding the object (again,
- 5 location information can be absolute location information such as latitude and longitude data and/or relative location information such as present distance from an oncoming vehicle).

- Such information is transmitted, as indicated earlier, compatibly with a
- 10 dedicated short range radio frequency-based roadside information service. Such transmissions would therefore be readily received by a vehicle already equipped to interact with the roadside information service. Consequently, no additional hardware investments or installations would be required to allow vehicles to benefit from such transmissions. Instead, only supplemental
- 15 programming would facilitate beneficial use of information received in such transmissions. For example, upon receiving such a beacon transmission from an individual jogging at night alongside a darkened road, the vehicle could ascertain from the information that a jogger is presently a predetermined distance ahead of the vehicle. Such information, particularly when combined
- 20 with information regarding the present speed of the vehicle, can be utilized in various ways to benefit both parties. For example, an alert can be provided to the driver of the vehicle of the jogger's proximity. Countless other applications are of course possible. Animals of value or that present a hazard to vehicles could warn of their presence in this way. Information regarding a pedestrian's
- 25 disabilities, which disabilities may not be obvious to a vehicle's driver, can be made available to the driver to thereby prompt greater or more informed care or behavior. Individuals requiring assistance can signal their location and their appropriate category regarding their status to thereby attract assistance in a relatively safe fashion. These and many other applications are all rendered
- 30 possible by provision of this object-borne radio 10 when operating in this beacon mode 50.

Referring now to FIG. 6, a remote transmit mode 60 will be described. Upon receiving a signal 61 (which signal is again compatible with the dedicated short range roadside information service) a determination 62 is made as to whether the signal includes one or more types of control signals. If not, the process can conclude 64. If a control signal is present, however, the radio 10 can effect a resultant transmission 63. The nature of the transmission and/or the content of the transmission can be controlled in whole or in part by the control signal itself. For example, a vehicle equipped with a roadside information service radio can occasionally broadcast a message requesting radios that are associated with a nonautomatic roaming object to themselves broadcast a message indicating their presence and/or location. Upon receiving such a control signal, the radio 10 can transmit 63 a message that includes both the requested or appropriate information regarding the corresponding nonautomotive roaming object and location information as available. This information is then received by the vehicle and can be used accordingly.

As another example, the radio 10 can be worn by a child. If the child becomes separated from his or her guardian the guardian can effect transmission of a control signal instructing the radio 10 to switch to a high-power mode of transmission and broadcast an identifying message that includes a present location for the radio 10 and hence the child. This information can then be utilized to locate the child. Such a signal can be initiated in a variety of ways. Pursuant to one approach, the guardian or other available person can simply broadcast the signal using either a short range or high-power transmission mode. If the radio 10 is within reception range of this broadcast, the signal can be received and an appropriate response sent as described. Pursuant to another approach, the guardian or other available person can broadcast the signal along with a repeat control signal. When received by another compliant radio, the repeat control signal can be decoded and serve to effect a repeated

broadcast of the original message. These repeated broadcasts can effectively increase the broadcast range and increase the likelihood of reaching the child's radio 10. By yet another approach, the guardian or other available person can contact the roadside information service infrastructure through some other means (such as by telephone, fax, or e-mail) to arrange for a systemwide transmission of the indicated signal.

If desired, and as described below, the radio 10 can retain in its memory at least a partial history of locations and corresponding operational states. For example, if the user of the radio 10 disables the radio 10 from operating in the beacon mode 50 or from operating in the remote transmit mode 60, this operational status can be stored along with the locations the user traversed while maintaining such operational status (time of day or elapsed time are other metrics that one might select to maintain as relevant to this history). At some later time, the radio 10 can receive a signal that constitutes a request to send part or all of this maintained history (by one embodiment, this can occur after the remote transmit mode 60 has again been enabled, and by another embodiment, such a query can be treated as a high priority signal that the radio 10 must respond to regardless of an otherwise disabled status).

This activity history regarding, for example, disablement of the transmission mode could be utilized to dynamically adjust insurance coverage terms and conditions for the nonautomotive roaming object associated with the radio 10 (usage of the radio 10 in its beacon mode 50 and remote transmit mode 60 should ordinarily enhance the safety of the object and hence use or nonuse of these functions could be used to receive favorable or unfavorable insurance rates). In one embodiment, the radio 10 could receive a follow-on message containing information regarding such dynamic adjustment of insurance coverage terms and conditions. This information could be provided in whole or in part to a corresponding user to prompt or reward desired behaviors.

So configured, the radio 10 can automatically respond to instructions and inquiries with transmissions that optionally include information regarding the corresponding nonautomotive roaming object and/or a present location for the object.

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Pursuant to one embodiment, the radio 10, upon receiving a signal 61, can determine 65 whether an imminent collision with an oncoming vehicle is likely. For example, if the received signal includes a specific message to this effect (as could be transmitted by a vehicle that has processed an earlier message

- 10 as transmitted by the radio 10 that included the radio's present location as compared to the vehicle's present location, speed, and heading to itself conclude that the collision is likely) this message could be directly interpreted to determine 65 that a collision is imminent. Upon determining 65 that a collision is imminent, the radio 10 could transmit 63 a message containing
- 15 specific items of information that may bring aid rapidly to the user and/or that will assist investigators who later try to determine what happened. For example, information such as present location, respective velocities and directional headings, identifying information from other objects and vehicles as recently received (which might be useful to aid in identifying potential
- 20 witnesses if necessary), and the fact that a collision is likely may all be useful transmissions to effect. Such information could be transmitted prior to the calculated time of impact and/or could also be transmitted subsequent to the impact if the device survives the collision.

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Referring now to FIG. 7, a remote disabled mode 70 will be described.

- Upon receiving 71 a signal, the radio 10 determines 72 whether the signal includes an instruction to disable the radio's transmitter. If not, the process
- 30 ends 74. If the signal does include a disable signal, however, the transmitter is disabled 73 automatically. This mode 70 can be useful in a variety of



situations. For example, hospitals usually forbid use of wireless communications products on their premises in order to avoid potential interference with delicate medical instrumentation. By positioning a roadside information service kiosk that transmits a beacon signal that includes this disable signal, such radios 10 as may be carried on the premises will be automatically disabled. Similarly, other radio-free zones, such as airplanes, can be accommodated as well.

Location information has been shown above to be an important part of many messages. Additional use of location information will now be described with respect to a location based operating mode 80 and with reference to FIG. 8. As mentioned above, upon determining 81 at least an approximate present location of the radio 10, the radio 10 can optionally store various items of information in a history (including operational states, transmitted messages, received messages, and location information as corresponds to any of the above).

In one embodiment, the radio 10 can determine 83 a present velocity for the radio 10. This can be done, for example, by using present location and recent location information to determine at least an approximate present velocity of the nonautomotive roaming object. By determining 84 that the present velocity "V" equals or exceeds a predetermined threshold "X" the radio 10 can determine, for example, that the corresponding object is now likely in a vehicle and therefore disable 85 the radio's transmitter and conclude 86.

Pursuant to another embodiment, the radio 10 can determine 87 whether the present location corresponds to any previously stored information in the memory. Such information can then be provided 88 to the user. For example, if the user is standing at a particular intersection, and if the radio 10 has information (such as information regarding a restaurant) that corresponds to that location, such information can be provided to the user via the user

interface 14. Pursuant to this embodiment, at least certain aspects of the user interface 14 are selectively controlled in response to location information.

The radio 10 can continue to determine 89 whether a signal has been received. If not the process can end 86. If a signal has been received, in one embodiment, the radio 10 can determine 90 whether signals from multiple proximal and similar units are being received. For example, and with momentary reference to FIG. 9, a first radio 10A may detect, for example, beacon mode signals from four other proximal and similar units (10B through 10E). Upon detecting 90 such a circumstance, the radio 10 can enable a crowd mode 91. A number of appropriate actions can be implemented in this context. For example, the radio 10 can automatically reduce its own transmission power to thereby minimize interference. Or, the radio 10 can simply disable its own transmitter. As another approach, one of the radios can automatically begin transmitting information to represent the presence and location of the group while the other radios simultaneously either disable their transmitters or significantly reduce their transmitting power. The information transmitted can optionally include identifying information for various members of the group and/or at least some category information (for example, certain categories may always be identified while other categories may be optional). Pursuant to this embodiment, nearby vehicles can receive useful information regarding the cluster of nonautomotive roaming objects while interference between units is potentially minimized.

The basic radio platform described above in its various embodiments has been shown to readily support a wide variety of beneficial activities that enhance the safety and comfort of both vehicles and their occupants and pedestrians and their property. By working compatibly with dedicated short range roadside information services, established communications infrastructure is leveraged with minimal additional cost. Although various embodiments have been described, those skilled in the art will recognize that

other modifications, alterations, and combinations are possible. Such modifications, alterations, and combinations should be viewed as being within the spirit and scope of the invention.

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We claim:

1. A device adapted and configured to be disposed on a nonautomotive roaming object, comprising a radio that is compatible with a dedicated short range radio frequency-based roadside information service, wherein the radio comprises at least one of:
  - a transmitter that transmits information regarding the nonautomotive roaming object compatibly with the dedicated short range radio frequency-based roadside information service; and
  - a receiver that receives information service information compatibly with the dedicated short range radio frequency-based roadside information service.
2. The device of claim 1 wherein the transmitter comprises a beacon transmitter that transmits object information automatically at least from time to time.
3. The device of claim 1 wherein the object information includes category information that identifies the nonautomotive roaming object as belonging to a particular predefined category.
4. The device of claim 1 wherein the object information includes personal identification information that identifies the nonautomotive roaming object as being a particular nonautomotive roaming object.
5. The device of claim 1 wherein the information service information sometimes includes a first signal, and wherein the transmitter includes an actuator having an input operably responsive to the first signal and an output operably coupled to a transmit actuator control, such that the transmitter will automatically transmit the object information upon receiving the first signal.

6. The device of claim 1 wherein the transmitter comprises a dedicated short range transmitter.

7. The device of claim 6 wherein the transmitter includes a high power mode  
5 of operation.

8. The device of claim 7 wherein the information service information  
sometimes includes a first signal, and wherein the transmitter includes an  
actuator having an input operably responsive to the first signal and an output  
10 operably coupled to a high power mode of operation actuator control, such  
that the transmitter will automatically transmit using the high power mode of  
operation upon receiving the first signal.

9. The device of claim 1 and further comprising a location determining unit  
15 that is operably coupled to at least one of the transmitter and the receiver.

10. The device of claim 1 wherein the information service information  
sometimes includes a first signal, and wherein the transmitter includes an  
actuator having an input operably responsive to the first signal and an output  
20 operably coupled to a disable actuator control, such that the transmitter will  
automatically be disabled upon receiving the first signal.

11. The device of claim 1 wherein the object information includes location  
information regarding the object.

12. The device of claim 11 wherein the location information comprises  
absolute location information that identifies a specific objective location of the  
object.

13. The device of claim 11 wherein the location information comprises relative  
location information that identifies a relative location of the object with respect

to at least one other object.

14. The device of claim 1 and further including a user interface operably coupled to at least one of the transmitter and the receiver.

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15. The device of claim 14 wherein the user interface includes a visual display.

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16. The device of claim 14 wherein the user interface includes an audio transducer.

17. The device of claim 14 wherein the user interface includes a tactile sensory output.

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18. The device of claim 14 wherein the user interface includes a text entry device.

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19. A method for use with a device that is adapted and configured to be disposed on a nonautomotive roaming object, the device comprising a user interface and a radio that is compatible with a dedicated short range radio frequency-based roadside information service, wherein the radio comprises at least one of:

25

- a transmitter operably coupled to the user interface that transmits information regarding the nonautomotive roaming object compatibly with the dedicated short range radio frequency-based roadside information service; and
- a receiver operably coupled to the user interface that receives information service information compatibly with the dedicated short range radio frequency-based roadside information service;

30

the method comprising automatically using location information to selectively control at least one of the transmitter and the user interface.

20. The method of claim 19 wherein automatically using location information to selectively control at least one of the transmitter and the user interface includes:

- 5     - determining a present location of the nonautomotive roaming object;
- transmitting the present location compatibly with the dedicated short range radio frequency-based roadside information service.

21. The method of claim 20 wherein transmitting the present location includes  
10   also transmitting category information that identifies the nonautomotive roaming object as belonging to a particular predefined category.

22. The method of claim 20 wherein determining a present location includes receiving global positioning system signals.

15   23. The method of claim 20 wherein determining a present location includes receiving location information compatible with the dedicated short range radio frequency-based roadside information service.

20   24. The method of claim 19 wherein automatically using location information to selectively control at least one of the transmitter and the user interface includes:

- receiving a first message compatible with the dedicated short range radio frequency-based roadside information service;
- 25   - determining a present location of the nonautomotive roaming object;
- transmitting a message that includes at least the present location of the nonautomotive roaming object.

25. The method of claim 24 wherein transmitting a message includes  
30   transmitting a message compatibly with the dedicated short range radio frequency-based roadside information service.

26. The method of claim 24 wherein transmitting a message includes transmitting a message using a high power transmission mode.

5 27. The method of claim 24 wherein transmitting a message further includes transmitting a message that indicates at least a likelihood that the device will imminently become at least partially nonoperational.

10 28. The method of claim 19 wherein automatically using location information to selectively control at least one of the transmitter and the user interface includes:

- determining that the nonautomotive roaming object is presently located proximal to a plurality of other nonautomotive roaming objects;
- automatically initiating a predetermined action.

15 29. The method of claim 28 wherein automatically initiating a predetermined action includes automatically initiating a reduced transmission power mode of operation.

20 30. The method of claim 29 wherein automatically initiating a reduced transmission power mode of operation includes disabling the transmitter.

25 31. The method of claim 28 wherein automatically initiating a predetermined action includes automatically transmitting at least some information regarding the other nonautomotive roaming objects.

32. The method of claim 19 wherein the device further includes a memory and wherein the method further comprises storing at least some history regarding the nonautomotive roaming object in the memory.

30 33. The method of claim 32 wherein storing at least some history regarding



the nonautomotive roaming object in the memory includes storing at least some history regarding location of the nonautomotive roaming object in the memory.

- 5 34. The method of claim 32 wherein storing at least some history regarding the nonautomotive roaming object in the memory includes storing at least some history regarding directional headings of the nonautomotive roaming object in the memory.
- 10 35. The method of claim 32 wherein automatically using location information to selectively control at least one of the transmitter and the user interface includes:
  - storing at least some activity history regarding disablement of the transmitter in the memory;
  - 15 - transmitting at least some of the activity history, such that the activity history regarding disablement of the transmitter can be utilized to dynamically adjust insurance coverage terms and conditions.
- 20 36. The method of claim 35 and further including:
  - receiving information regarding dynamic adjustment of the insurance coverage terms and conditions compatibly with the dedicated short range radio frequency-based roadside information service.
- 25 37. The method of claim 19 wherein automatically using location information to selectively control at least one of the transmitter and the user interface includes:
  - using location information to determine at least an approximate present velocity of the nonautomotive roaming object;
  - 30 - whenever the approximate present velocity at least exceeds a predetermined threshold, automatically disabling the transmitter.

38. A module constructed and arranged to physically and operably couple with and draw at least some operating power from a portable device, the module comprising a radio that is compatible with a dedicated short range radio frequency-based roadside information service, wherein the radio comprises at least one of:

- a transmitter that transmits information regarding the nonautomotive roaming object compatibly with the dedicated short range radio frequency-based roadside information service; and
- a receiver that receives information service information compatibly with the dedicated short range radio frequency-based roadside information service.

39. The module of claim 38 wherein the portable device comprises one of a portable two-way communications device, a personal digital assistant, a portable computer, and a global positioning system receiver.

40. A dedicated short range roadside information service radio constructed and arranged for installation in a vehicle, the radio including a module constructed and arranged to physically and operably couple with and draw at least some operating power from the radio, the module comprising a portable radio that is compatible with a dedicated short range radio frequency-based roadside information service, wherein the portable radio comprises at least one of:

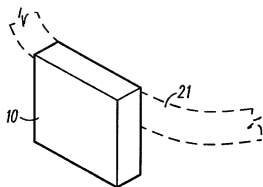
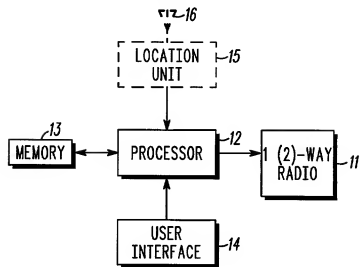
- a transmitter that transmits information regarding a nonautomotive roaming object compatibly with the dedicated short range radio frequency-based roadside information service; and
- a receiver that receives information service information compatibly with the dedicated short range radio frequency-based roadside information service.

### Abstract

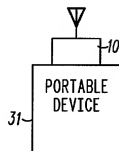
A radio (10) communicates compatibly with a dedicated short range roadside information service and is adapted and configured to be worn by a pedestrian  
5 or otherwise mounted on or installed in a variety of nonautomotive roaming objects. Various modes of operation are supported including a beacon mode (50), a remote transmitter mode (60), a remote disable mode (70), and a location based operating mode (80).

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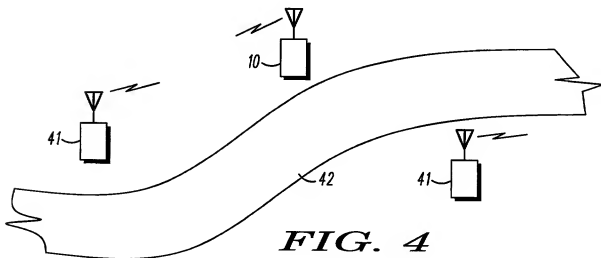
**FIG. 1**



**FIG. 2**



**FIG. 3**



**FIG. 4**

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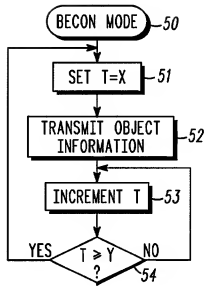


FIG. 5

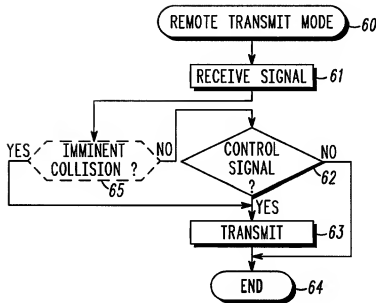


FIG. 6

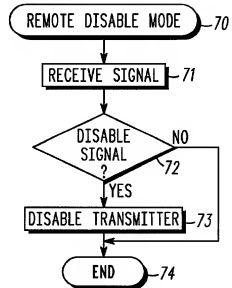


FIG. 7

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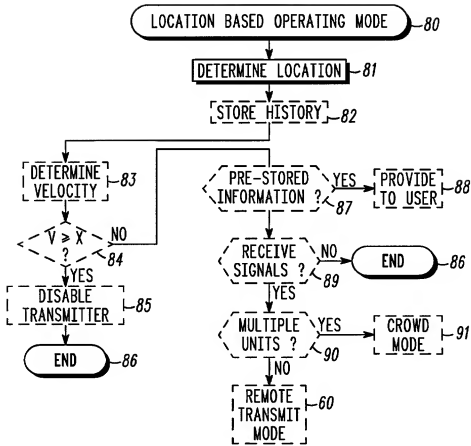


FIG. 8

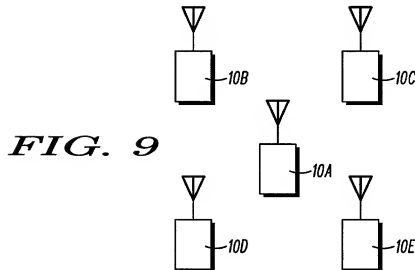


FIG. 9

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CML00120H(72470)

**DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)  
COMBINED WITH POWER OF ATTORNEY**

<input checked="" type="checkbox"/> Declaration Submitted with Initial Filing	<input type="checkbox"/> Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16(e)) required)	Attorney Docket Number	CML00120H(72470)
		First Named Inventor	Richard Bromham
		Application Number	_____
		Filing Date	_____
<input checked="" type="checkbox"/> Regular (Utility) Application	<input type="checkbox"/> Design application	Group Art Unit	_____
		Examiner Name	_____

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

METHOD AND APPARATUS FOR FACILITATING WIRELESS COMMUNICATIONS WITH A NONAUTOMOTIVE ROAMING OBJECT
---

the specification of which:

<input checked="" type="checkbox"/> is attached hereto	<input type="checkbox"/> was filed on: _____
	as U.S. Serial No.: _____
	and was amended on: _____
	<i>(if applicable)</i>

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent or inventor's certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.:

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?
				<input type="checkbox"/> Yes <input type="checkbox"/> No
				<input type="checkbox"/> Yes <input type="checkbox"/> No

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SE/02B attached hereto.

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below:

Provisional Application Serial No.:	
Provisional Application Filing Date:	

I hereby claim the priority benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which is material to the patentability of this application and which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Prior U.S. Application(s):

☒ no such application(s) filed  
☐ such application(s) identified as follows:

Application No.	Filing Date (day, month, year)	Status (Patented, Pending, Abandoned)

I hereby declare that: as to any claimed subject matter of this application which is common to my earlier United States or foreign application(s), if any, which I have identified above and claimed the benefit of priority thereof, I do not believe that the same was ever known or used in the United States before my invention thereof or patented or described in any printed publication in any country before my invention thereof or more than one year prior to the first of said earlier application(s), or in public use or on sale in the United States more than one year prior to the first of said earlier application(s), and that the said common subject matter has not been patented or made the subject of an inventor's certificate before the date of the first of said earlier U.S. application(s) in any country foreign to the United States on an application, filed by me or my legal representatives or assigns more than twelve months (six months if the present application is a Design patent application) prior to the first of said earlier U.S. application(s), if any; and that, as to any claimed subject matter of this application which is not common to said earlier application(s), if any, I do not know and do not believe that the same was ever known or used in the United States before my invention thereof or patented or described in any printed publication in any country before my invention thereof or more than one year prior to the date of this application, or in public use or on sale in the United States more than one year prior to the date of this application, and that said subject matter has not been patented or made the subject of an inventor's certificate in any country foreign to the United States on an application filed by me or my legal representatives or assigns more than twelve months (six months if the present application is a Design patent application) prior to the date of this application.

I hereby appoint the attorney(s) or agent(s) associated with: 22242 to prosecute this application and transact all business in the patent and

trademark office connected therewith.



Address all telephone calls to:

Steven G. Parmelee

Telephone: 312 577-7000

Facsimile: 312 577-7007

Address all correspondence to: Customer Number 22242



I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of first-named or sole inventor	<u>RICHARD BROMHAM</u>	
Inventor's signature	_____	Date _____
Residence	<u>Chicago</u> City	<u>ILLINOIS</u> State or Foreign Country
Citizenship	<u>United Kingdom</u> Country	
Post Office Address	<u>303 W. Eugenie St.</u> Street Address	
	<u>Chicago</u> City	<u>ILLINOIS</u> State or Country
		<u>60614</u> Zip Code

Full name of second-named joint inventor	<u>WALTER L. DAVIS</u>	
Inventor's signature	_____	Date _____
Residence	<u>Arlington</u> City	<u>WASHINGTON</u> State or Foreign Country
Citizenship	<u>United States</u> Country	
Post Office Address	<u>31402 N Brooks Creek Rd.</u> Street Address	
	<u>Arlington</u> City	<u>WASHINGTON</u> State or Country
		<u>98233</u> Zip Code

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Full name of third-named joint inventor	ROBERT M. GARDNER	
Inventor's signature		Date
Residence	Gilbert	ARIZONA
	City	State or Foreign Country
Citizenship	United States	
	Country	
Post Office Address	829 W. Emerald Island Dr.	
	Street Address	
	Gilbert	ARIZONA 85233
	City	State or Country Zip Code

Full name of fourth-named joint inventor	SHRIRANG JAMBHEKAR	
Inventor's signature		Date
Residence	Paletine	ILLINOIS
	City	State or Foreign Country
Citizenship	United States	
	Country	
Post Office Address	915 W. Sparrow Ct.	
	Street Address	
	Paletine	ILLINOIS 60067
	City	State or Country Zip Code

Full name of fifth-named joint inventor	MARIA THOMPSON		
Inventor's signature		Date	
Residence	Hoffman Estates	ILLINOIS	
	City	State or Foreign Country	
Citizenship	United States		
	Country		
Post Office Address	1950 Dogwood Dr.		
	Street Address		
	Hoffman Estates	ILLINOIS	60195
	City	State or Country	Zip Code

Full name of sixth-named joint inventor			
Inventor's signature		Date	
Residence			
	City	State or Foreign Country	
Citizenship			
	Country		
Post Office Address			
	Street Address		
	City	State or Country	Zip Code

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